In the claims:

1. A flex circuit for use in a fuel cell, the flex circuit, comprising:

a fuel-side flexible circuit, comprising:

a first flex substrate, wherein the first flex substrate comprises openings through which pass liquid fuel,

a first porous layer adjacent the first flex substrate, the first porous layer including a first catalyst layer,

an anode electrode between the first flex substrate and the first porous layer, and

a boundary layer disposed adjacent the first porous layer, the boundary layer preventing cross-over of the liquid fuel;

an air/water-side flexible circuit, disposed in parallel with the fuel-side flexible circuit, comprising:

a second flex substrate, wherein the second flex substrate comprises openings through which pass water,

a second porous layer adjacent the second flex substrate, the second porous layer including a second catalyst layer, and

a cathode electrode between the second flex substrate and the second porous layer; and

a center section disposed between the first and the second flex circuits, wherein the first and the second flex substrates are conformable to non-planar shapes.

2. The flex circuit of claim 1, wherein the center section is a proton exchange membrane.

3. The flex circuit of claim 1, wherein the center section is a channel carrying dionized water, the center section further comprising spacers to maintain a separation between the fuel-side flexible circuit and the air/water-side flexible circuit.

4. The flex circuit of claim 1, wherein the flex circuit is formed in a shape of a cylinder.

5. The flex circuit of claim 4, wherein the liquid fuel is contained within an interior of the cylindrical flex circuit.

6. The flex circuit of claim 4, wherein the liquid fuel is contained exterior to the cylindrical flex circuit.

7. The flex circuit of claim 1, wherein the flex circuit is formed in a shape of a polygon, and wherein the liquid fuel is contained within an interior of the polygon.

8. The flex circuit of claim 1, wherein the flex circuit is in a shape of a star having N points, and wherein the liquid fuel is contained within an interior of the star-shaped flex circuit.

9. The flex circuit of claim 1, wherein the first porous layer comprises a plurality of pores oriented in a vertical direction and approximately parallel to a local plane defined by the first porous layer, wherein a size one or more of the plurality of the pores is chosen such that the liquid fuel is transported to near a top vertical limit of the one or more pores by capillary action.

10. The flex circuit of claim 1, wherein the first and the second porous layers comprise porous metal.

11. The flex circuit of claim 10, wherein the metal is chosen from the group consisting of zinc and silver.

12. A flex-based fuel cell, comprising:

a first flexible circuit; comprising:

a first flexible substrate, and

a porous metal/catalyst layer, wherein the porous metal/catalyst layer comprises a plurality of pores oriented to distribute fuel to substantially all of the first flexible circuit using a capillary action;

a separation section adjacent the first flexible circuit; and

a second flexible circuit adjacent the separation circuit, wherein the first and the second flexible circuits are conformable to a substantially non-planar shape.

13. The flex-based fuel cell of claim 12, wherein the separation section is a proton exchange membrane.

14. The flex-based fuel cell of claim 12, wherein the separation section is a channel comprising dionized water.

15. The flex-based fuel cell of claim 12, wherein the substantially non-planar shape

comprises a cylinder.

16. The flex-based fuel cell of claim 15, wherein an interior of the cylindrical flex-based fuel cell comprises liquid fuel.

17. The flex-based fuel cell of claim 16, wherein the liquid fuel is methanol.

18. The flex-based fuel cell of claim 12, further comprising a dry film adhesive disposed between the first flexible substrate and the second flexible substrate.

19. A flex-based fuel cell, comprising:

means for converting liquid fuel to protons, comprising:

means for transporting liquid fuel through the liquid fuel converting means, and

first means for flexibly supporting the liquid fuel converting means;

means for receiving the protons, comprising:

means for converting the protons to water vapor, and

second means for flexibly supporting the proton converting means; and

means for exchanging the protons from the liquid fuel converting means to the proton converting means.

20. The flex-based fuel cell of claim 19, wherein the liquid fuel transporting means comprises a porous metal layer having means for causing capillary transport of the liquid fuel within the porous metal layer.

21. The flex-based fuel cell of claim 19, wherein the proton exchanging means comprises a proton exchange membrane.

22. The flex-based fuel cell of claim 19, wherein the proton exchanging means comprises a dionized water channel.

23. A method of preparing a flex circuit for a fuel cell, comprising:

patterning a conductive material on flex supporting means having a front surface and a back surface, wherein the conductive material is patterned on the front surface;

attaching a layer of porous material to the conductive material;

depositing a layer of catalytic coating on the surface of the porous material; and

ablating the supporting means from the back surface to make openings so that the porous material is exposed.

24. The method of claim 23, further comprising the step of coating the catalyst layer with a thin layer of proton transfer membrane.